REMARKS

This amendment is submitted to be fully responsive to the Office Action of Paper No. 07292005. Currently, claims 15, 20-22, 25 and 29-37 are being considered. By way of this amendment, claims 15, 25, and 29 have been amended; claim 38 canceled; and claim 39 added.

Claim 15 is objected to because of dependence on claim 1 which is drawn to a non-elected species. In response to this objection, the dependency of claim 15 has been modified to claim 29 consistent with suggestions on page 2 of Paper No. 07292005. Reconsideration and withdrawal of this objection is thereby requested.

Claims 29 and 38 stand rejected under 35 U.S.C. §112, second paragraph, with regard to the limitation of "heated material" found in claim 38 lacking antecedent basis. In response to this rejection, claim 38 has been canceled and as such the rejection as to claim 29 under 35 U.S.C. §112, second paragraph, is believed to have been overcome.

Claims 20 and 21 stand rejected under 35 U.S.C. §103(a) over Buxbaum (U.S. 5,931,987) in view of Official Notice. Claims 22 and 25 stand rejected under 35 U.S.C. §103(a) over Buxbaum in view of LaPierre et al. (U.S. 6,348,278). Lastly, remaining claims 15 and 29-37 stand rejected under 35 U.S.C. §103(a) over Buxbaum in view of Prasad et al. (U.S. 5,888,272) and LaPierre et al.

Remarks Directed to Rejection of Claims 20 and 21 under 35 U.S.C. §103(a) over Buxbaum and Official Notice

Buxbaum is cited with respect to Figures 1A-3A as disclosing all of the claimed elements with the exception of "a raffinate compressor disposed in fluid communication with said outlet channel." To bolster this limitation of Buxbaum, a statement of notice has been provided that this element is conventional to the art. The outstanding Office Action on page 3, section 2 states:

> With respect to the raffinate compressor disposed in fluid communication with said outlet channel, it is conventional to provide a compressor or venture means in the gas purification system and it would have been obvious to do so here to facilitate the removal and/or purging the raffinate from the membrane.

(Paper No. 07292005, page 3, section 2).

Consistent with MPEP 2144.04, Applicant submits that the position of the compressor intermediate between the reactor and the outlet affords a measure of system control not previously available. As detailed in the instant specification at page 21, line 15 – page 22, line 4, the induction of a low pressure region on the raffinate side of the membrane is a simple way to control reactor function as compared to modifying reactor temperature or feed pressure. As such, Applicant submits that in the context of the gas purification system including a gas selective membrane that a raffinate compressor is in fact not conventional to the art and that pending claims 20 and 21 are patentable over Buxbaum and official notice.

Should the Examiner maintain this rejection, Applicant traverses the assertion of official notice. The Examiner is respectfully requested in this instance to produce authority for the statement that a raffinate compressor in fluid communication with an outlet channel is conventional to selective membrane gas purification.

In light of the above remarks, reconsideration and allowance of claims 20 and 21 under 35 U.S.C. §103(a) over Buxbaum in view of official notice is requested.

Remarks Directed to Rejection of Claims 22 and 25 under 35 U.S.C. §103(a) over Buxbaum in View of LaPierre et al.

Buxbaum is cited as teaching all of the elements of claims 22 and 25 with the exception of a fuel cell powered by a constituent gas (claim 22) and a raffinate burner (claim 25). To bolster the teachings of Buxbaum, LaPierre et al. is cited as teaching the "constituent gas

(purified hydrogen via line 40) is supplied to the fuel cell (52) to generate electricity (Fig. 2)" and also "a portion of the raffinate (via line 48) is fed to the raffinate burner (94) to combust the gas and generate heat for the vaporizer and the reforming reaction (Col. 10, lines 26-35)." (Paper No. 07292005, section 3 spanning pages 3-4).

With respect to claim 22, as this claim depends from claim 20 which is now believed to be in allowable form, on the basis of this dependency claim 22 is likewise believed to be in allowable form.

Claim 25 no longer recites a raffinate burner within the Markush group of the claim and as such, LaPierre et al. is submitted to not bolster the teachings of Buxbaum with respect to a mixed gas flow feed pump, raffinate back pressure controller or oxygen sensor. Reconsideration as to the substance of claim 25 is therefore respectfully requested. New claim 39 includes the limitation that the component is a raffinate burner and as with claim 22 depends from claim 20, now believed to be in allowable form. Based on this dependency, claim 39 is also submitted to be in allowable form.

In light of the above amendments and remarks, reconsideration and withdrawal of the rejection as to claims 22, 25, and potentially with respect to new claim 39 under 35 U.S.C. §103(a) over Buxbaum in view of LaPierre et al. is requested.

Remarks Directed to Rejection of Claims 15 and 29-37 under 35 U.S.C. §103(a) over Buxbaum in View of Prasad et al. and LaPierre et al.

Buxbaum with regard to claims 29, 33, 35 and 37 is cited as teaching the claim elements with the exception of a burner for combusting the raffinate produced by the reactor-purifier system to yield a heated exhaust gas with the heat from the burner being used to heat the reactor-purifier system in addition to failing to teach a source of air mixed with the raffinate before

combustion in the burner. Prasad is cited to bolster the teachings of Buxbaum with respect to these elements in teaching the:

> raffinate (via line 10) from the reactor-purifier system (35), air stream (12), and fuel stream (11) is fed to the burner (combustor 14) to produce a gas stream 17, which is used to purge the reactor-purifier system (ion transport membrane 35). Thus, it would have been obvious in view of Prasad to one having ordinary skill in the art to modify the system of Buxbaum '987 with a burner and air stream as taught by Prasad in order to create an exhaust gas stream to facilitate in purging the reactor-purifier system. With respect to the feed pump and back pressure regulator, it is conventional to provide a feed and back pressure regulator to the gas purification and it would have been obvious to do so here to provide a means for feeding or transport the mixed gas to the reactor-purified system and to control the amount of raffinate to the burner.

(Paper No. 07292005, section 4, pages 4-5).

It is respectfully submitted that the prior art reference combination of Buxbaum with Prasad et al. necessarily requires that Prasad be modified to alter the mode of operation such that it no longer functions in its intended mode. There is longstanding law that such modification of a reference cannot be obvious within 35 U.S.C. §103. This particular issue was addressed by the Patent Office Board of Appeals in *Ex Parte Weber*, 154 USPQ 491 (1967), in which the Board stated:

> "It is our opinion that the cited prior art does not teach that it would be obvious to rearrange the machine of Hempel et al. as proposed by the examiner. To do so, would completely alter the construction and mode of operation of the stencil cutter of Hempel et al., so that it would not function in its intended manner. It appears to us that the obviousness of the proposed changes is not derived from the cited prior art, but only from appellant's disclosure." at 492.

In regard to Prasad et al., this reference is cited as teaching that "the raffinate (via line 10) ... is fed to burner (combustor 14) to produce a gas stream 17 ...." (Paper No. 07292005,

section 4, page 4, last full sentence). It is submitted that line 10 is connected to the permeate side (7b) of the system 35 detailed in Prasad et al.

Claim 29 has been amended to recite with greater clarity that the purification is via a membrane and is not intended to narrow the claim scope. In amended claim 29, the permeate side equivalent has only purified hydrogen separated from the raffinate stream (retentate side) by transmission through a hydrogen selective membrane. Thus, to direct a raffinate according to the present invention of claim 29 to a burner based on the prior art combination of Buxbaum and Prasad et al. would require that lines 8 and 10 of Prasad et al. be switched. Consistent with the holding in *Ex parte Weber*, such a modification would necessarily render Prasad et al. incapable of performing its intended function and therefore is improper. As such, claim 29 and those claims that depend therefrom are submitted to be nonobvious over the prior art reference combination of Buxbaum in view of Prasad et al.

LaPierre et al. is silent as to raffinate handling sufficient to bolster Prasad et al. with regard to these deficiencies. As such, Applicant submits that pending independent claim 29 and those that depend therefrom are nonobvious over the prior art.

In light of the above amendments and remarks, reconsideration and withdrawal of the rejection as to claims 15 and 29-37 under 35 U.S.C. §103(a) over Buxbaum in view of Prasad et al. and LaPierre et al. is requested.

Summary

Claims 15, 20-22, 25, 29-37 and 39 are submitted for consideration. Each claim is believed to be in allowable form and directed to patentable subject matter. Reconsideration and withdrawal of the outstanding rejections and the passing of this application to issuance are

solicited. Should the Examiner find to the contrary, he is respectfully requested to contact the undersigned attorney in charge of this application to resolve any remaining issues.

Respectfully submitted,

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Erica L. Triner